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TUBERCULOSIS IN THE INSANE:

With special reference to

PULMONARY TUBERCULOSIS,

and with Notes on

CALMETTE'S OPHTHALMIC REACTION IN TUBERCULOSIS,

being

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TUBERCULOSIS IN THE INSANE:

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The subject of Tuberculosis in the Insane is one which has occupied the minds of Alienists at intervals for many years.

Since Dr Clouston first published his observations many writers have entered the field and much discussion has taken place, chiefly at the meetings of the Medico-Psychological Association of Great Britain and Ireland.

It had been long recognised by those in the Specialty that Tuberculosis is a disease of common occurrence in the Insane, and yet it was many years before Alienists became alive to the necessity, the urgent necessity, of taking steps to try and reduce the frequent occurrence of Tuberculosis in Asylums and the high mortality therefrom.

Doubtless the apparent apathy was largely due to reasons based upon financial difficulties. The increased expenditure involved in many cases in order

to combat and cope successfully with the disease, made Asylum Physicians chary of entering upon a campaign which meant in all certainty a largely increased "rate of maintenance", that "bête noir" of the majority of Asylums' Boards of Management.

Whatever the cause, the fact remains, that, until within comparatively recent years, little or nothing was done to attempt to reduce the number of cases of Tuberculosis.

It is now more than forty years since Dr Clouston⁽¹⁾ first pointed out the frequency with which Tuberculosis occurred in the Insane; and it is a striking and interesting fact to learn that his successor in office at Morningside Asylum, Dr George Robertson⁽²⁾, makes particular mention of the same question as elicited by modern methods of diagnosis. This statement, coming as it does after a period of forty years - years which have brought us such a wealth of knowledge of the etiology, diagnosis, course and treatment of Tuberculosis - leads us to conclude that there must be an intimate relationship betwixt Insanity and Tuberculosis.

Crookshank⁽³⁾ in his Prize Essay on "The Frequency, Causation and Prevention of Tuberculosis in Asylums", pointed out that the frequency of Tuberculosis as a cause of death in the Insane was really

much greater than the "Official Death Rate", accounting for this by the fact that only one cause of death was returned in the death certificates to the Lunacy Commissioners, hence that many people who were certified as dying from causes other than Tubercular, may have suffered from and shewn evidence of Tuberculosis, a notable example being in the case of patients dying from General Paralysis of the Insane. Clouston found that in 97 patients dying from General Paralysis, 27 shewed evidence of Tuberculosis.

Even with the Official Death Rate from Tuberculosis as a standard, the alarming fact was made clear that the Asylum Tubercular death rate was 4.5 times higher between the ages of 35 and 45 in males, that is to say, the age group of the general population most liable to Tuberculosis.

On the other hand it has been alleged that the actual Tubercular death rate in Asylums is not so high as the actual Tubercular death rate outside Asylums. Greene⁽⁴⁾, in 'Notes upon the Incidence of Tuberculosis in Asylums', suggests that the returns of the Registrar-General re Tuberculosis are not so high as they should be, since in many cases Tuberculosis is over-looked because no post-mortem has been made, and further, he avers, 'The General Practitioner, moreover, is loath to assign Tuber-

'culosis as a cause of death when other reasons can 'be stated, because he fears to stamp upon the living members of the deceased's family the stigma of 'a transferable and hereditary disease.' I am of opinion, however, that this suggestion is too far fetched; the average general practitioner is as keen as anyone in desire and efforts to combat the "Great White Scourge" and his last wish, I am sure, is to screen the presence of Tuberculosis when it occurs amongst his patients.

Even if one does make allowance for a few such 'sentimental death certificates', investigation and experience both lead one to the conclusion that Tuberculosis even now as in years past is more prevalent in the Insane than in the mentally sound of the same age periods, this being particularly true of Pulmonary Tuberculosis.

The following tables illustrate the greater frequency of Phthisis in Asylums as compared with the general population.

I. Phthisis death-rate (per 1000 of the Average Resident Population.

	1894	1895	1896	1897
All Asylums, England & Wales	14.1	15.7	13.7	14.7
Irish District Asylums	25.7	19.6	18.5	23.9
All Scottish Asylums	10.5	11.2	11.6	10.4
London County Asylums	9.5	12.1	8.5	9.8

II. Phthisis death-rate (per 1000 living)
for England and Wales.

	All ages both sexes	35-45 Females	35-45 Males
Quinquennium 1891-1895	1.463	2.305	3.268

*at least
at age periods*

The term 'average resident population' is analogous to the 'number living' of the Registrar General's returns.

It will be seen, therefore, that in England and Wales the death rate from Phthisis in their Asylums is 4.5 times as great as that of the general population in Males between the ages of 35-45, at which age period the highest mortality from Phthisis occurs.

It is a significant fact, and one which reflects much credit upon the administration of Scottish Asylums generally, that whereas Tubercular disease is more prevalent in Scotland than in England, yet the death rate in Scottish Asylums is about 20 per cent lower than in English Asylums.

It being conceded, therefore, that Tuberculosis, as judged by the death rate from that disease, is more common in the Insane than in the Sane, our next consideration is - Of the sexes, which is more

susceptible, the male or the female. My experience has been that Tuberculosis is more prevalent amongst the Female Insane than among the males of the same class.

The Relative Tubercular death-rate of the two sexes as computed from the statistics of the Lunacy Commissioners⁽⁵⁾ of England and Wales for the years 1895 to 1905 inclusive, shews an average for these years of Males 144 per 1000 deaths, and of Females 176 per 1000 deaths.

Doubtless there is some allowance to be made in respect of a certain proportion of males dying and certified as dying from General Paralysis of the Insane, but who were also the subjects of Tuberculosis. But even with an allowance in that respect, there seems to me still an excessive prevalence amongst the Female Insane, as compared with the Male Insane, of deaths arising from Tuberculosis.

The following table brings out very clearly the greater liability of the Females to Phthisis as compared with the Males in the Scottish Institutions for the Insane during five consecutive quinquennia.

III. Shewing the Absolute Annual Average Mortality from Phthisis in Scottish Institutions for the Insane during five consecutive quinquennia.

	1870-74	1875-79	1880-84	1885-89	1890-94
Average Resident Population:					
Male	2928.8	3434.0	3999.7	4324.1	4800.0
Female	3268.7	3831.5	4359.2	4616.0	5202.7
Total Number of Deaths:					
Male	264.6	302.6	330.6	351.2	445.8
Female	270.4	278.2	329.2	340.4	405.6
Death Rate per 1000 (average resident population):					
Male	90.3	88.09	83.2	81.2	92.8
Female	82.7	72.6	75.5	73.7	77.9
Deaths assigned to Phthisis:					
Male	33.8	38.2	37.2	40.6	52.6
Female	52.0	45.2	52.4	48.6	57.8
'Official' death rate from Phthisis					
Male	11.2	11.1	9.3	9.3	10.9
Female	15.9	11.9	12.0	10.39	11.1
Percentage of deaths assigned to Phthisis					
Male	12.8	12.6	11.2	11.6	11.8
Female	19.2	16.2	15.9	14.3	14.3

In future, however, the true relations of the sexes re Tuberculosis ought to be more accurately defined, since in England and Wales at least there is now a return made giving more than one cause of death where such contributory cause exists, whereas previously only one cause of death needed to be given.

It is interesting to note, however, that whereas Females shew a greater proclivity to Tuberculosis, this is mainly as regards Pulmonary Tuberculosis. Other forms of Tuberculosis account for deaths in both sexes in about the same ratio.

The returns of the Registrar General show that in the Sane population males are more liable to Tuberculosis than females.

The question at once suggests itself. If in the general population males are more liable to Tuberculosis than females, why are the females in the Insane population more susceptible than the males?

To understand the cause, or at least in order that one might venture to suggest the cause or causes, let us see for a moment what are the commonly accepted etiological factors of Tuberculosis. The exciting cause is the Tubercle Bacillus, which gains access to the body by one of three ways, viz. by inoculation, ingestion, or by aspiration. Probably

the first is a very rare method: the second, by means of food, is not so rare, alas! but the third route is responsible for the majority of the cases, especially of Pulmonary Tuberculosis. It has been proved that the mode of infection is by the dried sputa of Phthisical individuals being blown about and inhaled.

But not all who inhale the Tubercle Bacillus develop Tuberculosis. Certain predisposing factors here come into action, and, disregarding heredity, the most important of these are overcrowding and bad ventilation, both of which are potent factors to reduce vitality and present a suitable weakened state of defence to the onslaughts of the tubercle bacillus.

Applying these known facts to the Insane, let us see how they operate there.

The female Insane are more numerous considerably than the male Insane, the reason being that the average residence in Asylums is much longer in the former. Hence it is that in nearly every instance of overcrowding in an Asylum, it is the female side which is in default.

Now, overcrowding of itself almost surely leads to a deficient supply of air, so we are provided at once with two of the chief predisposing factors to

Tuberculosis.

Further it is my experience that Insane women as a rule are much more given to filthy habits than Insane men, thus providing a further cause. In Asylum life too, women, from their occupations, get much less regulated exercise in the open air than the men, and also I consider that the greater tendency amongst the females to irregular feeding is detrimental to their general health. Women are much more given to secreting food to carry away and eat at odd intervals than men.

It must be taken into consideration also that the longer hair of the women offers a better hiding place to the Tubercle Bacillus than the short cropped hair of the men. The difficulty of keeping the hair of certain insane women clean is only appreciated by those who have the Insane under their immediate and daily observation.

Impure (rebreathed) air is the chief debilitating cause which predisposes to Tuberculosis. It is most difficult to get a dormitory continuously ventilated during the night. Apart from artificial ventilation, sometimes the only way to ensure the entrance of fresh air into dormitories where women are sleeping, not under continuous observation, is to have several small panes taken from the glass in the

windows. It is hopeless to try and keep the windows open, even the little space that is possible in Asylums. The patients get up and shut them as soon as the nurse has gone.

These factors then seem to me to be at least partly the reason why the female Insane are more prone to Tuberculosis than the males of the same class.

Age.

The average age at death of insane patients dying from Pulmonary Tuberculosis in the Asylums, Hospitals for the Insane, and Registered Houses in England and Wales during the years 1895-1905 inclusive, was, Males 39.7, Females 40.5.

This slight difference between the sexes is probably accounted for by the fact that in the male Insane Pulmonary Tuberculosis, as a rule, runs a less chronic course than in the female Insane.

I know of no evidence to shew that the male Insane acquires the disease earlier in life than the female.

Professor Wyllie⁽⁶⁾ in his University Lectures on the Practice of Medicine refers to the fact that Pulmonary Tuberculosis often makes its appearance

apparently as a developmental break-down; and in this respect the same might be said of the mentally alienated.

Dr C. J. Shaw⁽⁷⁾, from his investigations of the Opsonic Index in the Insane, comes to the conclusion that the Insane adolescent is more liable to Tubercular infection than the Insane adult. He concludes this from noting that the opsonic index of adolescent cases of Insanity is lower than that of adult cases of Insanity.

On the other hand, in the Insane as in the Sane, no age is immune. I have known an old man of 89 years who developed an active form of Phthisis following on an attack of Influenza, and died in a few weeks, the autopsy revealing the presence of active, recent breaking down tuberculosis as well as signs of long standing healed (?) tubercle.

Form of Mental Disorder.

The type of mental disease, in which the sufferer shews the poorest resistance to the Tubercle Bacillus, is markedly that of mental depression. When one considers the physical debility which so frequently accompanies Melancholia, the utter indifference to food, the active resistance even against

taking nourishment and the general lack of tone in the circulatory and digestive systems, one is not surprised to find that these cases yield easily to the attacks of the Tubercle Bacillus.

In 182 patients dying of Tuberculosis in this Institution⁽⁸⁾ (East Riding of Yorks County Asylum), or dying from other causes but showing at the post mortem examination definite evidence of tuberculosis, 55 were suffering at death from Melancholia; 36 suffered from Mania; 35 were Dements, though possibly some of these contracted Tuberculosis whilst still acutely insane; 26 were congenitally deficient Imbeciles or Idiots; 21 were the subjects of General Paralysis; and 9 only suffered from epileptic Insanity.

Thus it will be seen that the Acutely Insane are more liable to Tuberculosis than the chronically insane, and that individuals suffering from epilepsy are not markedly susceptible.

I have observed repeatedly how rare it is for a wound in an epileptic to become septic. They have a great power of resistance to the pyogenic organisms and apparently this extends somewhat to the Tubercle Bacillus.

Shaw's⁽⁷⁾ conclusions as to the influence of the mental disorder upon Tuberculosis are as follows:-

- (i.) That the acutely insane are more liable to tubercular infection than the chronically insane, their respective opsonic indices being .87 and .93.
- (ii.) That adults suffering from Melancholia are more susceptible to the attacks of the tubercle bacillus than adults suffering from Mania. The respective indices he found were .88 and .91.

Forms of Tuberculosis.

All forms of Tuberculosis may be met with amongst the insane, but by far the most common is Pulmonary Tuberculosis.

Lupus is not common. I have only met with two cases in almost five years amongst an average resident population of over 500 insane.

Surgical Tuberculosis occurs in all classes of the Insane. In my experience Tubercular glands in the neck is the most frequent form, and not infrequently one meets with Tubercular abscesses in association with caries of bones. I have observed that there is in such cases not the same tendency in the Insane as in the Sane for these abscesses to persistently discharge after being evacuated. Generally the result of surgical interference is good and the wound heals in a very short time.

Tubercular disease of the different joints is

occasionally seen, and my experience has been that these cases occur very often in patients who are congenitally deficient mentally.

Turning to tuberculosis of the internal organs, one notes that Tubercular Meningitis is strikingly rare in the Insane, and when it does occur, the patients, in my experience, are nearly always imbeciles or idiots, that is to say, patients whose brains are badly nourished, being poorly supplied with blood and consequently not so well fitted to resist the attack on the meninges as are the acutely insane whose brains, generally speaking, are supplied with more blood than even normal (sane) individuals' are. In fact, one might almost go so far as to say that the acutely Insane are provided with a pathological (as opposed to artificial) Bier's hyperaemia. Cases of Tubercular Meningitis have been reported among the acutely insane. Mickle⁽⁹⁾ reports several cases and points out several items of difference in the course and symptoms of the disease in these cases as compared with the Sane.

He notes that the disease is of comparatively short duration and characterised by the very early onset of Coma. Also the pulse rate is not uncommonly much increased, instead of the rate being slowed as is usually the case.

Some of the cases shewed the tubercular deposit along the vertex or convexity of the brain instead of at the base, and in these cases there were no forms of localised paralysis observed.

I have only seen one case of gross brain tuberculosis, and it occurred in a male melancholic patient who had advanced pulmonary and intestinal tuberculosis.

Abdominal Organs.

Tuberculosis of the Intestines is very commonly observed in the Insane. Very few insane phthisical patients expectorate their sputum, especially when the disease is far advanced; many swallow it, and as a result Tuberculosis of the Intestines ensues, generally not until late in the history of the case. In fact, except for a few rare cases where the primary focus is abdominal, Tubercular infection of the intestines is nearly always secondary and terminal.

In the majority of the cases, the form is that of ulceration; most commonly the site is the termination of the ileum or the ascending colon, but no portion is exempt; I have seen ulcers as high as the duodenum and as low as the rectum.

One is unable to foretell the extent of the

ulceration by the symptoms. The chief symptom is diarrhoea, but in bad cases of ulceration there may be little or no diarrhoea. Again, one may have a profuse diarrhoea and find little or no ulceration on post-mortem examination.

Frequently there is a profuse diarrhoea characterised by numerous offensive stools containing bright blood. The patient soon becomes exhausted and emaciation is rapid and profound.

Of the two chief forms of Tuberculosis of the Peritoneum, that which is characterised by absence of ascites and by matting of the bowels by tubercular adhesions, is much more frequently seen. It is generally secondary to a focus in one or both lungs and may give rise to very few signs in the Insane, but may be a somatic cause for a delusion or delusions concerning the patient's viscera.

Tuberculosis of the Spleen is occasionally met with, generally part of a wide spread infection.

Tuberculosis of the Kidneys is not met with so often as one might expect, in view of the fact that the kidneys in the Insane are seldom or never sound. I have yet to see the 'Insane' kidney to which I can apply the term healthy. When present, the tuberculosis, as in ordinary individuals, may take one of two forms. It may be present as caseous nodules in

the cortex of the kidney, or it may occur as a pyelitis. In the latter case, symptoms by which the condition may be diagnosed are more likely to occur such as frequency of micturition, pain after the completion of the act, the presence of an acid pyuria and the possibility of demonstrating the presence of Tubercle bacilli therein. In its later stages it is characterised by a hectic fever, profuse sweats and much emaciation.

Tuberculosis of the suprarenal bodies is commonly cited as one of the causes for the disease known by the name of Addison.

Addison says in reference to it: "The leading characteristics of the morbid state to which I would direct attention are anaemia, general languor and debility, the remarkable feebleness of the heart's action, irritability of the stomach, and a peculiar change of colour in the skin occurring in connection with the diseased condition of the suprarenals. The body wastes; not however presenting the dry and shrivelled skin and extreme emaciation usually attending malignant disease. Slight pain or uneasiness is from time to time referred to the stomach, and there is occasionally actual vomiting."

Hale White⁽¹⁰⁾ states that Tuberculosis of the

suprarenals is much the commonest cause of Addison's disease, and also emphasises the fact that there is frequently tuberculosis elsewhere in the body. Addison's disease is probably of no more common occurrence in the Insane than in the Sane, but it is interesting and curious that the only cases I have seen in the Insane - three in number - all had this in common, that each one from onset to fatal issue was peculiar because of an entire absence of the usual pigmentation. The other symptoms were typical, but the pigmentation was wanting.

The following is a brief resume of the history of one of the cases.

W.B., aet. 62 years, male: single: occupation, general labourer. Admitted March 1908. History of alcoholism. Mental state on admission that of Mania - he was restless, exalted, excitable, talkative, incoherent in speech and irrational in conduct. After a few weeks he became much quieter and was able to sleep out of continuous observation. His physical state on admission was fair. He had a slight degree of Chronic Bronchitis and Emphysema, but no evidence of Tuberculosis. His weight was 9 st. 9 lbs. His heart shewed slight dilatation to the right, the pulse rate was rapid, and the tension rather plus. The urine was of low specific gravity

and contained traces of albumen.

He remained fairly quiet and 'in statu quo' as regards his physical state until October 1908, when a progressive debility and apathy manifested themselves, and at the same time he began to lose weight. An examination failed to reveal any evidence of pulmonary tuberculosis. At this time also he changed in his mental state; he became dull, suspicious and morose, and developed a delusion that his food was poisoned and then complained of nasty sensations in his abdomen which he attributed to the "poison". His pulse rate fell to normal, but the tension was also much diminished. He was occasionally sick.

The most outstanding feature was the extreme weakness and the progressive loss of weight. In spite of the fact that no abnormal pigmentation could be found, although it was carefully looked for in all the usual and unusual sites, it was suspected that the suprarenals might be at fault, especially since frequent examination failed to reveal the presence of Tuberculosis in the lungs, elsewhere, or of malignant disease.

His weight in October 1908 was 9 st. 3 lbs. In January it had fallen to 7 st. 9 lbs. In April it had fallen still further to 7 st. 2 lbs. In July, by which time he was so feeble as to be bed-ridden,

it was only 6 st. 9 lbs., and before his death a short time, it had come lower still to 6 st. 3 lbs.

As the weakness became excessive he was unable to expectorate - his cough was ineffectual - evidence of final cardiac failure shewed itself in a rapid, weak, irregular pulse and oedema in the lungs, and he gradually sank and died.

The post-mortem examination shewed in the right lung much congestion and oedema of the lower lobe; large and medium bronchi in a state of chronic inflammation, with much thickening of the mucous membrane; emphysema at apex, base and free margin, and scars from old tuberculosis at the apex. The left lung was similar, but the base was firmly adherent to the parietal pleura.

The heart was small - the right side dilated, the tricuspid orifice unusually patent, but the mitral and aortic valves competent.

The suprarenal capsules were easily found and much enlarged. On section they were seen to be much inflamed and contained numerous deposits of caseating tubercles which had largely destroyed the glandular tissue proper.

The kidneys were cirrhotic and atrophied.

Other organs - brain, liver, spleen - shewed considerable atrophic changes. There was no

evidence anywhere of any new growth.

The majority of the cases of Tuberculosis met with, however, are represented in the Insane by Pulmonary Tuberculosis. On this account, therefore, special reference must be made to it in regard to diagnosis, signs and symptoms, etc.

Surgical Tuberculosis amongst the Insane does not present any greater difficulty in diagnosis than it does in the mentally well. It may be overlooked if the patient do not complain, but once attention is drawn to it, there are no peculiar features calling for remark.

PULMONARY TUBERCULOSIS.

Although the Acutely Insane are more susceptible to Tuberculosis than the Chronically Insane, yet the former do not provide the heavy death rate. Phthisis is a fairly chronic disease - if we except the acute miliary form and the rapid Pneumonic form of Osler⁽¹¹⁾. In the Insane, Phthisis is a particularly chronic disease, especially when it occurs in women. We shall see when we come to study the relationship of Phthisis to the prognosis of Acute Insanity, that its influence is an evil one. Hence

many acute cases remain to become chronic and demented, and ultimately, after a longer or shorter period, to succumb to Pulmonary Tuberculosis.

It is the chronic residue, therefore, who provide a large number of the deaths from Phthisis, these and some patients who are mentally, congenitally deficient.

One is led to enquire, 'Do the patients acquire the disease before or after admission chiefly?' There are advocates for both views.

Greene holds a brief for the former view, and Shaw also states that Asylum Residence does not conduce particularly to the development of Phthisis. Drapes⁽¹²⁾, on the other hand, avers that it is not so much Insanity as Asylum life which is the potent factor. Menzies⁽¹³⁾ supports this view in a paper on the subject, and remarks somewhat caustically as follows: "But it is chiefly the chronic residue "which causes the trouble, for they infect many "others around them, and especially those who are "working in dusty places, the upholsterer's or stone "mason's shop or the bake-house. And each in turn "becomes a fresh centre of infection until this position has been arrived at, that a collection of "human beings in an Asylum, whose every act is supposed to be regulated by a scientific Medical Super-

"intendent, shews a tubercular death rate at least
"ten times as high as that of the general population
"outside at corresponding ages."

It is conceivable that under different circumstances both views may be partially correct. Much depends upon the class of population drawn upon and the environment of different Asylums as to whether the number of cases acquiring the disease during Asylum residence is in excess of those admitted suffering from Phthisis. Further, there is a considerable source of error in the possibility that many patients may be admitted suffering from Phthisis in an early stage and consequently easily overlooked, and when the disease progresses somewhat and clear signs make their appearance, it would then seem as if the disease had been contracted in the Asylum when in reality it is not so.

During the last five years the records of this Institution yield the following figures:

The direct admissions (i.e. patients who have not come under treatment from other Asylums) for the years 1905-09 inclusive, have been, Males 242, Females, 302.

Of the 242 males, 22 or 9.9 per cent. were diagnosed by the Medical Officers to be suffering on admission from Phthisis; 16 or 6.6 per cent have

since developed unmistakable signs of Phthisis, and these were supposed to be free from it on admission.

Dealing with the Female admissions numbering 302, 42 or 13.9 per cent were reported to have the disease when admitted, whilst only 5 of those reported free on admission have thus far developed signs of the disease, representing 1.6 per cent. The accuracy of these figures can only with absolute certainty be verified by following each case to a post-mortem. Possibly Phthisis has been diagnosed which did not exist, possibly existing Pulmonary Tuberculosis has not been diagnosed. But in the main the figures are accurate enough for practical purposes and within limits would seem to shew that so far, at least, as this Institution for the Insane is concerned, more patients are admitted with Phthisis than acquire it after admission.

DIAGNOSIS OF PHTHISIS IN THE INSANE.

There are two main factors upon which depends the ease or difficulty with which one can make a diagnosis in the Insane, and these are

- (1) the extent of the disease
- (2) the mental state of the patient at the time of examination.

An advanced case of Phthisis is essentially easier to diagnose than an incipient one, and it is self-evident that the difficulty of examination in, say, an acutely maniacal patient, whose whole muscular system is in action, who probably is shouting or at least talking all the time attempts are being made to examine him, the difficulty is much greater in such an event than when one is dealing, for example, with a quieter patient, such as a moderately intelligent dement who submits quietly to examination and is even able to carry out, at least fairly well, instructions given to facilitate diagnosis.

In endeavouring to make a diagnosis, it is usually well to conduct the investigation as far as possible upon the same lines as one would adopt in dealing with a sane individual, departing therefrom only when it is rendered necessary by the peculiar nature of the case as modified by the mental state of the patient.

Inspection.

This can be carried out as well in the Insane as in the Sane, with the exception of acutely excited, restless and impulsive patients, or of resistive, stuporose cases.

One notes the form of the chest, the expansion

on inspiration, but more important is to compare carefully the relative and local expansion. Many insane breathe in a shallow fashion. One also notes any flattening of a part or sinking of the apex which may be present. The inspection of the apical movement is best observed from above and behind.

Palpation confirms the results of inspection.

Percussion.

This is, certainly in early cases, the most valuable of the ordinary means of diagnosis and can usually be carried out effectually. Careful percussion, especially over the apices posteriorly, will bring out the impaired note, if present, whether it be due to the earliest possible lesion, viz. the primary bronchial tubercle with obstruction of the bronchi and resulting collapse of the area of lung supplied from the obstruction to the passage of air, or whether it be due to a more advanced but still early stage where the lung tissue proper has become the seat of tubercular deposits.

In the Insane as in the Sane, the commonest site for invasion is the posterior half of the apex of the right lung, but the possibility of a basal situation in old people, or after an attack of

Pneumonia, must not be overlooked.

Auscultation.

This in the Insane is often very unsatisfactory as in many cases it is impossible to get one's patient to breathe satisfactorily, and often their natural automatic respiration is of the shallowest type. Much depends upon the mental state. Some cases, such as quiet moderately demented patients, will breathe well if properly instructed how to do so. It is no use saying 'Take a long breath', or 'Breathe deeply'. The intention is no doubt good on the patient's part, but the result for auscultatory purposes is generally worse than useless. The 'long breath' generally consists in hunching up the shoulders till they almost touch the ears, dropping them back again to rest and at the same time the patient emits a gasp.

My invariable procedure is to give a demonstration to the patient of what I want. In this way I am enabled to hear the breath sounds satisfactorily and note any departure from the normal, which, if present, is always viewed with suspicion.

With patients whose breathing is very shallow, the only portion of auscultation which is of real diagnostic value is the Vocal Resonance, which is

governed by the same laws in the insane as in the sane.

When one is dealing with very early cases of Phthisis, especially cases newly admitted, practically the only means of diagnosis are Inspection, Percussion and Auscultation, always of course excepting the use of Tuberculin.

Cases further advanced, or developing after long residence, afford many additional factors which aid one in arriving at a diagnosis.

The Temperature.

Here we are met by a point of difference between the sane and the insane. The value of noting the temperature whilst great and never to be neglected, is not such an accurate guide to the patient's state as in the sane.

The vagaries of the Insane temperature are sometimes remarkable, nor can one always safely predict that there will be pyrexia in any given case, in which, in the sane, under similar conditions, it would occur.

Thus I have known Acute Lobar Pneumonia run its course with practically no temperature above normal, and I have repeatedly seen temperatures as high as 102° F. and 103° F. speedily reduced to normal by

having the bowels thoroughly evacuated. The value of the routine investigation of the temperature is therefore slightly detracted from, but there is never any excuse for omitting this means of diagnosis.

To get the most accurate result, the temperature should be taken four hourly - oftener if the nature of the case warrants it, but generally a four hourly chart covers the daily rise.

It is important that the nurses - male or female, be carefully instructed how to proceed.

The so-called 'half minute' thermometers are a snare and a delusion. Two, three or even four minutes should be insisted on and carried out where possible in order to ensure accurate results. Pyrexia is looked on naturally with suspicion, especially if other causes, such as mental excitement, gastro-intestinal toxaemia, etc., can be excluded. One would also be inclined to enquire further into a case whose temperature never necessarily rose above normal, yet showed marked sub-normal limits in the morning⁽¹⁴⁾.

Pulse.

Excluding mental causes, a fast, somewhat low tension pulse would excite one's suspicions, especially if persistent. The rapid pulse arising from

excitement is frequently accompanied by an increased blood pressure, which helps one somewhat to differentiate between the two states.

Body Weight.

Since in most Asylums the weight of all the patients is ascertained at least once every three months, this forms a valuable aid to diagnosis. It is possible to note any persistent, though not necessarily a constant, fall in weight, and in this way one is led to examine patients, having first excluded other possible causes such as excitement, insomnia and refusal of food. Especially in male insane, excluding General Paralysis, long continued excitement and other wasting diseases, a rapid fall in weight is very characteristic of Phthisis. My experience has been that once this rapid loss of weight sets in, the end is not long delayed. Male Insane may go for a long period apparently 'in statu quo', then suddenly there is a rapid breakdown, a speedy loss of weight and fatal issue.

With women, the disease runs a more gradual course and there are often remissions in the bodily weight, especially in the summer months.

Night Sweats.

The vaso-motor system in the Insane is notoriously erratic in its action, and in recent cases of mental disorder the action of the sweat glands is often very deficient. Consequently profuse sweating in cases of Phthisis is not so common an occurrence as in the sane.

Further, when it does occur the patient does not usually remark on it, so, unless he happens to be sleeping under constant observation and the nurse has been specially instructed to note the occurrence and report accordingly, it is liable to be overlooked.

My experience, however, has been that it is rather the exception than the rule for night sweats to occur in the Phthisical Insane.

Other general symptoms must not be overlooked, such as anaemia, loss of appetite, gastric irritability, lack of energy, etc., all of which are common accompaniments of Phthisis, especially in the Chronic Insane, who have previously been in an apparently robust state of health, taking food heartily, and leading (for them) active lives.

Local Signs and Symptoms.Pain.

It depends largely upon the mental state of the patient whether this symptom, if present, will be complained of. In the majority of cases there is little pain. Speaking generally, the sensibility of most insane - especially chronic - is blunted as regards pain.

When pain is complained of the cause in most cases is Pleurisy. But I have seen the occurrence, in a case of Acute Recent Melancholia, of marked hyperaesthesia of the skin over the left half of the chest anteriorly. On examination he was found to have a large pleural effusion in the left sac, and the operation of withdrawing the fluid was followed by vanishing of the hyperaesthesia.

It has been my experience both amongst the Sane and the Insane that practically all the cases of so called Idiopathic Pleurisy, whether with or without effusion, are tubercular in origin. For this reason therefore, it is of great importance not to treat such cases too lightly, and always to treat the cases as tubercular. Frequently it is early evidence of Pulmonary Tuberculosis, and it has been remarked that such cases, commencing with Pleurisy, tend to be very chronic in their course.

Cough.

This symptom exhibits no particular peculiarity when it occurs in the Insane. The cough is more liable to occur at night or in the early morning. Frequently one's attention is drawn to a patient by the complaints of those in the neighbouring beds, that they cannot get to sleep on account of the coughing of their neighbour. Many cases of Phthisis become far advanced and never shew the symptom of cough. This is particularly so amongst the Males, especially those who are much demented, in whom the reflexes are dulled.

Expectoration.

Many insane phthisical patients, like children, seldom expectorate sputum but swallow it, though this habit is more marked in the later stages, when they become bed-ridden and feeble.

Many insane are, however, given to the habit of spitting promiscuously, and these cases may be unknown tubercular subjects and serve as ambulatory foci for the spread of the disease. It is possible, by dint of perseverance, to train patients who are in bed, to use spitting mugs. The trouble lies with the acutely excited and the dirty and degraded types, who so easily contract the dangerous habit of

spitting everywhere and on everything. In view of the above facts it is a matter of some difficulty to obtain sputum for bacteriological examination, or to examine for the presence of lymphocytes which are said to precede the tubercle bacillus in the sputum. It is possible sometimes to obtain sputum which has been swallowed during the night, by washing out the stomach in the morning before the first meal of the day and to demonstrate the tubercle bacillus therein occasionally, but the method can only be adopted with quiet docile patients, and the inability to demonstrate the causal organism does not prove that the patient is free from Tuberculosis.

Haemoptyses does not often occur in the Insane as a sign or complication of Phthisis, and therefore it calls for no further remark.

Emphysema and Bronchitis are of some importance since, occurring as they often do, in patients of somewhat advanced years, their presence is apt to obscure a supervening tuberculosis. It is in such cases that the regular weighing of patients proves of particular value, and also, to a lesser degree, the routine investigation of the temperature.

I have observed that it is not uncommon in such cases to meet with an intermittent fever for several days, as high in the evening as 103° F. or 104° F.

with complete remissions lasting an irregular period of time. In such cases one finds not uncommonly at the post-mortem examination that irregular areas of Tubercular Broncho-pneumonia are scattered throughout the lungs.

Phthisis Laryngei is occasionally seen as a complication of pulmonary tuberculosis in the Insane and reveals its onset in the usual manner - with huskiness of the voice - proceeding at a later stage to aphonia and difficulty of swallowing.

Mental State.

Much help can be obtained towards establishing a diagnosis by a careful observation of the mental state, especially in patients of moderately long residence.

Such patients, when they develop Phthisis, shew a distinct mental change. They become dull, sullen, irritable, morose and morbidly suspicious, develop solitary and asocial habits, tend to sit about alone, or, if permitted, will lie about. Females cover their heads up with apron or skirt. More recent cases, previously quiet, become noisy, restless, irritable and excitable, and incline to be querulous and troublesome. Such changes should always excite suspicion and be followed by sending the patient to

bed for observation and examination.

Lastly, as an aid to diagnosis - and most valuable - are the different methods of using Tuberculin as a diagnostic agent. One may inject it in cases shewing no pyrexia and watch for a rise of temperature.

Or again, one may use it in the skin reaction of Von Pirquet, although recent investigation by this means at the Royal Asylum at Edinburgh tends to shew that it is almost too delicate a reaction to adopt for practical purposes.

Thirdly, one can apply Tuberculin to diagnosis by adopting the Ophthalmic test of Wolff-Eisner and Calmette.

The Course of Phthisis in the Insane.

In the vast majority of the cases the disease is very chronic, particularly so in the female Insane. The whole existence of Asylum patients conduces to this state of affairs. Their lives are ordered for them, they have 'to take little thought for the morrow', in many cases, at least, which have become chronic. They have regular hours, fixed meal times, work according to their capabilities, and a fair amount of open air exercise. Their food

generally is as good or better than the food of the population outside in the same social scale. All of these therefore are factors which tend to make the disease run a chronic course, though some few cases, notably patients suffering from the acuter mental disorders, exhibit a very low power of resistance and rapidly succumb to the disease in a few months.

Relationship between Tuberculosis and Insanity.

Etiology:

The influence of Tuberculosis as a causal factor of Insanity is two-fold. It may be an immediate cause, or it may be remote in its action. Whether the agent giving rise to the mental alienation is a toxine from the Tubercle Bacillus, or whether the general vitality is lowered as a result of the Tuberculosis and the accumulation of other toxins thus facilitated, is not conclusively settled. Certain it is that we have in many cases no other satisfactory cause to attribute the mental disorder to, except Tuberculosis. The remote effects of Tuberculosis are seen in the tendency for Tubercular parents to produce offspring who have unstable nervous systems, who are the subjects e.g. of migraine,

hysteria and the mild forms of epilepsy.

Tredgold⁽¹⁵⁾, in his elaborate work on Mental Deficiency, states that in the families of 34 per cent of aments, whose family history he investigated, there was a pronounced tendency to tubercular lesions.

Thus it would appear that Tuberculosis is related not only to the causation of the acuter forms of mental disorder, but is also a determining factor in the occurrence of congenital deficiency.

The three great factors in fact are, Syphilis, Tuberculosis and Alcoholism in the progenitors.

Dr Clouston⁽¹⁶⁾ remarks upon the frequent occurrence of Insanity and Tuberculosis in different members of the same family and describes a form of Insanity to which he gives the term Phthisical Insanity, the chief clinical features of which are suspicion, unsocialness, inability to perform every day duties, occasionally delusions and mild attacks of excitement. It forms 3 per cent of all forms of Insanity and only 30% recover their mental equilibrium.

The influence of Tuberculosis is indeed a malignant one as regards the prognosis of the mental disorder. Out of 38 males admitted during the last five years to the East Riding Asylum, and who were suffering

from Phthisis, or who have since admission shewn signs of Phthisis, only 3, or 7.8 per cent, have recovered their mental stability sufficiently to be discharged. And in many cases the natural tendency in mental disorder towards relapse is greatly increased by the presence of Tuberculosis.

PREVENTION OF TUBERCULOSIS.

There are two main principles involved in the question of Prevention of Tuberculosis, and these are: (1) Prevent, if possible, the infection of healthy, i.e. non tuberculous, patients: (2) Try to arrest the progress of the disease in those already affected.

The conclusions arrived at by the Special Committee on Tuberculosis⁽¹⁷⁾ appointed by the Medico-Psychological Association were as follows:

- "
1. Phthisis is prevalent in our public Asylums to an extent which calls for urgent measures.
 2. A very large number of cases of Phthisis have acquired that disease after admission to the Asylum.

The special causes for the increased prevalence of phthisis in our Asylums are, in our opinion:-

- (a) Overcrowding, with consequent insufficient day, and especially night, cubic space per patient.
- (b) Insufficiency of hours in the open air.
- (c) Defects in ventilation and heating.
- (d) Uncleanly habits.
- (e) Faults in dietary. "

We have seen what an adverse influence is exercised by tuberculosis on the prospects of mental recovery; and we have seen that the adolescent insane is very susceptible to the disease and that melancholiac patients yield a large proportion of the cases of Phthisis. Now both Adolescent Insanity and Acute (recent) Melancholia yield a large number of mental recoveries. Hence it is the last thing that we desire, to expose these recent recoverable cases to the risk of infection with a disease which, if contracted, means for the patient, in many instances, no hope of mental recovery - the gradual drifting into hopeless Dementia and a final fatal issue from Phthisis.

How are we to prevent this undesirable issue?

The only certain method is by the complete isolation and segregation of all cases of Phthisis occurring amongst the Asylum population.

The difficulties in the way are chiefly financial, but other than financial difficulties make

their appearance, and these are associated chiefly with the difficulty in the Insane of making an accurate diagnosis in early cases. So that even with an Isolation Hospital on Sanatorium principles, one cannot be certain that all the tubercular patients are in residence there. The question of diagnosis has already been fully discussed.

In the Asylum itself, as distinct from the Sanatorium, certain measures ought always to be carried out.

- (a) Overcrowding should be avoided at all costs.
- (b) Natural Ventilation should be thoroughly carried out in preference to artificial 'systems'.
- (c) The dietary should be abundant in fat - or at least more abundant than the average Asylum dietary.
- (d) As far as possible, check the habit of spitting.

THE TREATMENT OF TUBERCULOSIS.

Since the treatment of Tuberculosis, and especially Phthisis, differs so little in the Insane from the treatment in the Sane, there is little need to enter into a detailed account.

The treatment may be separated into two classes,

General and Special.

Of General measures, the most important are abundance of fresh air and sunshine, carefully regulated exercise, a generous dietary supplemented by Cod Liver Oil, and very careful attention to the patient in the event of 'catching cold'.

The only Special measure which need be mentioned is the treatment by Tuberculin injections. I have not personally treated a sufficiency of cases to warrant an opinion based upon experience. I have treated in all eight cases by this special method, and from observing these cases I conclude that in early cases of Tuberculosis it is a curative agent. In cases which are further advanced, its effect is rarely curative but rather that of retarding the progress of the disease.

I have not, in any of the cases treated, seen any sign that the use of Tuberculin, in carefully regulated doses, had any tendency to hasten the course of the disease in any respect.

Urea and its salts have been used in the treatment of Phthisis, and Dr J. L. Baskin⁽¹⁸⁾ reports favourably on its effect in Phthisis in the Insane.

Out of seven cases treated, one died, two recovered both physically and mentally, and the remainder shewed considerable amendment.

The suggested modes of action of Urea are:

- (1) That it increases phagocytosis.
- (2) That it has a local action as a solvent for tubercle bacilli.
- (3) That it acts as a general alterative.
- (4) That it is a specific anti-toxin to the toxin of the tubercle bacillus.

NOTES OF CALMETTE'S OPHTHALMO-REACTION
IN 50 INSANE PATIENTS.

On June 17th, 1907, Professor Calmette made known to the Medical World his new method of diagnosing Tuberculosis.

The name of Wolff-Eisner is also associated with the method, which is based upon the reaction which the ocular conjunctiva gives when a solution of Tuberculin is brought into contact with it.

Since his discovery was published, physicians in all countries have investigated the matter and in the main have found that Calmette's claim to its being an accurate means of diagnosing the presence of Tuberculosis is justifiable.

F. Parkes Weber, however, offers a theoretical

objection to the routine use of the ophthalmo-reaction. He points out that even in apparently healthy persons after a negative instillation, a second, ten days or so later, gives a decidedly positive reaction.

Similarly the conjunctiva of a patient who has been tested by Calmette's reaction (with positive or negative result) "sometimes becomes reddened or decidedly inflamed if a dose of tuberculin is afterwards injected under the patient's skin."

Parkes Weber considers that this furnishes an explanation of the spontaneous recurrences of conjunctivitis which have been observed in tubercular patients a week or more after the ophthalmo-reaction has been tried. He considers that in such cases an 'auto-inoculation' with Tuberculin has resulted from the employment of the ophthalmic test, and goes on to say, "Theoretically, therefore, the ophthalmo-reaction when tried in Tuberculous patients might be expected to give rise to recurrent attacks of conjunctivitis in the tested eye. In practice, fortunately, this seldom, though occasionally, occurs."

In the insane patients whom I have submitted to the test, this has fortunately not occurred in any instance; though in one case in which the reaction

was negative at the first attempt, a second instillation a week later in the same eye was followed by a definite reaction. The patient has well-marked evidence of pulmonary tuberculosis in an active form.

The great value of Calmette's reaction for use in the Insane is the simplicity of the technique. The instillation is generally effected before the patient realises what is to happen, and one has only to guard against the drop being expelled by muscular action and against subsequent irritation or infection.

In intelligent patients a warning against rubbing the eye is generally sufficient.

In excited cases, or patients of uncertain habits as to cleanliness, a gauze bandage is desirable.

The most satisfactory procedure is to have the patient in bed until 48 hours after the test has been used. Observation is thus much facilitated.

In order to avoid an accidental infection which might be mistaken for a positive reaction and result in much pain and even damage to the eye, solutions used should be absolutely sterile.

In all, I tested 50 cases - 20 males and 30 females. The patients were drawn from all types of mental disorder and the following, briefly, are the

results noted.

The Males.

Nine patients suffering from Melancholia were tested. Of these four shewed no evidence of Tuberculosis after careful examination, and the result of the test was found to be negative.

The remaining five were the subjects of Phthisis in varying stages.

One case of incipient phthisis shewed only slight impaired percussion note at the right apex posteriorly - the reaction in this case was slight and extended only slightly beyond the caruncle - it passed off after 48 hours.

A second case was a patient with chronic phthisis of long duration, with increased vocal resonance and bronchial breathing in the left upper lobe. Reaction well marked: onset in four hours; subsided in 48 hours.

The third was a patient with recent, active phthisis, complicated by pleurisy with effusion; the reaction was well marked: onset rapid; complete in 12 hours: vascular injection, fibrinous exudate and lachrymation: it subsided in 24 hours.

The fourth patient had tubercular cervical glands and early signs at the left apex. The reaction was well marked and subsided in three days.

The fifth case of Melancholia was one shewing moderately active phthisis in the right lung affecting the upper lobe. Reaction was well marked; onset in 8 hours and decline in 48 hours.

Two cases of Dementia were tested; in one no physical signs could be discovered indicating tuberculosis, and the ophthalmo-reaction yielded no result.

The other patient was tested three days before his death from phthisis pulmonalis: the reaction in this case was very feeble and passed off within 24 hours.

Two cases of Idiocy with Epilepsy - free from tuberculosis as far as could be ascertained - yielded a negative test.

One patient suffering from advanced General Paralysis, but apparently free from Tuberculosis, also gave a negative result. The same happened in the case of an Imbecile, tested.

But two cases of Insanity with Epilepsy, each having an impaired percussion note at the right apex, and one having bronchial breathing and increased vocal resonance though no accompaniments, both proved negative when tested.

One patient suffering from Delusional Insanity, who had had Lupus apparently, now healed, and having

an impaired apical note with harsh breathing, yielded a positive result: onset in 4 hours, reddening of the caruncle and vascular injection, passing off in 36 hours.

One case of Stupor was tested. He had slight pyrexia, impaired percussion note over the right upper lobe: breathing bronchial in the right infra-clavicular area, with numerous dry sounds. He yielded a well marked positive result, commencing in 8 hours and passing away in 24 hours.


Of the males, therefore, 8 shewing evidence of tuberculosis reacted positively when tested: 3 males who had signs suggestive of Tuberculosis gave no reaction when tested.

But in no instance was a positive result recorded in any of the remaining 9 who were all apparently free from Tuberculosis when examined.


The age of the youngest patient tested was 17 years and of the oldest submitted to the test, it was 49 years.

F E M A L E S

No.	Age	Mental Dis- order	Residence	Evidence of Tuberculosis	Other Diseases	Reaction
1	47	Dementia, formerly Melancholia	5 Years	Pyrexia: Diarrhoea: Loss of Weight: L. apex dull: harsh breathing: increas- ed V.R.	Nil	Well marked: onset 6 hrs. complete in 36 hrs.
2	43	Melancholia	2 Years	Loss of Weight: occasional pyrexia: cavity at left apex	Chronic Bright's Disease	Well marked: onset 12 hrs. complete in 48 hrs.
3	33	Melancholia	2 Years	Loss of Weight: pyrexia: abscess formation: gastric irritability: cavity formation in both lungs: cough	Nil	Slight: onset 12 hrs. complete in 48 hrs.
4	60	Melancholia (Dementia)	2 Years	Dullness on per- cussion at R. Apex: breathing bron- chial: V.R. +	Chronic Bright's Disease	Well marked: onset delay- ed 36 hrs. complete in 48 hrs.
5	23	Melancholia	18 Months	Active tuberculosis both lungs: emaciation pro- found: pyrexia	Occa- sional Epilep- tic fits	Slight: onset 24 hrs. complete in 48 hrs.
6	35	Melancholia	6 Months	Apical note dull on left side: breathing harsh	Anaemia: dyspepsia	Negative: (Recovered mentally)
7	39	Melancholia	6 Months	Percussion note dull at right apex	Anaemia: dyspepsia	Slight: onset 6 hrs. subsided 36 hrs.

No.	Age	Mental Disorder	Residence	Evidence of Tuberculosis	Other Diseases	Reaction
8	44	Melancholia	3 months	Nil	Oral Sepsis	Negative
9	36	Stupor	18 months	Loss of Weight: occasional pyrexia: dullness at right apex: breathing bronchial: V.R. + crepitations	Gastritis	Well marked: onset 8 hrs. subsidence 48 hrs.
10	23	Stupor	1 year	Nil	Chlorosis	Negative
11	30	Epileptic Insanity	12 years	Loss of Weight: cough: dullness over right lung to percussion: breathing  crepitations	Epilepsy	Well marked: onset 12 hrs. subsidence 48 hrs.
12	30	Epileptic Insanity	1 year	Pyrexia: emacia- tion: cough: cavity in left lung	Chlorosis	Slight: onset 8 hrs. subsidence 24 hrs.
13	31	Epileptic Insanity	4 years	Dullness to per- cussion upper lobe left lung: breath- ing bronchial: oc- casional accompts. dry pleurisy at base	Epilepsy recurrent attacks of ery- thema nodosum	Well marked: onset 4 hrs. subsidence 48 hrs.
14	52	Epileptic Insanity	3 years	Nil	Epilepsy	Negative
15	38	Dementia	19 years	Nil	Nil	Negative

No.	Age	Mental Disorder	Residence	Evidence of Tuberculosis	Other Diseases	Reaction
16	35	Dementia	10 years	Dullness to percussion right apex: breathing harsh: V.R. +	Nil	Slight: Onset 6 hrs subsidence 24 hrs.
17	34	Dementia	4 years	Nil	Cerebral Syphilis aortic aneurysm	Negative
18	53	Imbecility	6 months	Nil	Perni- cious anaemia	Negative
19	34	Imbecility	4 years	Strumous Keratitis: Scars of old abs- cesses: tubercular cervical glands	Gastric ulcer	Slight: onset 8 hrs. subsidence 48 hrs.
20	45	Imbecility	12 years	Loss of Weight: Dullness at apices	Nil	Negative
21	17	Imbecility	7 years	High pyrexia: Loss of Weight and appetite: loss of energy: active (both lungs phthisis)	Nil	Negative - 1st test: positive - slight, same eye a week later
22	47	Folie Circulaire	17 years	Tubercular cervical glands: percussion dull at left apex: breathing Δ no accompts.	Nil	Well marked: onset 8 hrs. subsidence 4 days
23	42	Delusional Insanity	8 years	Percussion dull right upper lobe: Breathing Δ V.R.+ occasional crepi- tations	Nil	Well marked: onset 12 hrs. subsidence 48 hrs.

No.	Age	Mental Dis- order	Residence	Evidence of Tuberculosis	Other Diseases	Reaction
24	22	Idiocy with Epilepsy	8 years	Loss of Weight: loss of energy	Epilepsy	Well marked: onset 8 hrs. subsidence 36 hrs.
25	56	Imbecility with Epilepsy	14 years	Tuberculosis of knee and ankle: active phthisis in right lung	Epilepsy	Well marked: onset 12 hrs. subsidence 4 days
26	55	Idiocy	27 years	Signs of cavity in left apex	Valvular disease of the heart	Well marked: onset 6 hrs. subsidence 3 days
27	36	Dementia	10 years	Nil	Nil	Negative
28	40	Confusional Insanity	2 months	Right apex dull: Breathing  V.R. + : left apex cog-wheel breathing	Anaemia Bron- chitis ?	Negative
29	44	Epileptic Insanity	12 years	Active phthisis in both lungs	Epilepsy	Well marked: onset 8 hrs. subsidence 4 days
30	40	Delusional Insanity	15 years	Loss of Weight: pyrexia: Active phthisis at left apex	Nil	Well marked: inset 12 hrs. subsidence 3 days

In 23 of the 30 females tested, there was evidence, presumptive or certain, of Tuberculosis and of these 23 patients 19 yielded a positive result to the test. Seven of the 30 females were apparently free from tuberculosis, and in no instance did any yield a positive result.

In the majority of instances where the disease was actively progressing, the onset of the reaction was rapid and the effects passed away more rapidly than in chronic cases.

Wolff-Eisner distinguishes three types of reaction - "normal" reaction, which lasts for 4 days; "rapid" reaction, complete in 24 hours, which indicates an unfavourable prognosis; and "permanent" reaction, persisting from 6 to 20 days, which is prognostically favourable and is observed chiefly in cases of healed tuberculosis (Philip).

In none of the cases tested has there been any grave disturbance resulting from the test.

There did not seem to be any exact relation between the extent of the reaction and the extent of the disease. Some active cases of Phthisis gave well marked reactions, and some chronic cases were equally well marked.

But the chief value seems to lie in this, that in no instance was a positive result seen in a

patient apparently free from Tuberculosis, and a positive result of some sort was obtained in most of the Tuberculous subjects.

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